



United States  
Department of  
Agriculture

Forest  
Service

Southwestern Region  
Forest Health  
Arizona Zone Office

2500 S. Pine Knoll Drive  
Flagstaff, AZ 86001-6381  
FAX (928) 556-2130  
Voice (928) 556-2073

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Subject: Spruce beetle in Recreation Sites on the Pinaleños

To: George Asmus, District Ranger  
Safford Ranger District, Coronado National Forest

On August 30, 2001 Joel McMillin and John Anhold, Entomologists with the Arizona Zone Office, met with Dick Streeper and Randall Smith to survey for bark beetles in the Pinaleño Mountains. Spruce beetle, *Dendroctonus rufipennis*, has been killing spruce throughout much of the higher elevations of the Pinaleños over the past three years (see Biological Evaluation by Wilson et al. 1999). It is thought the beetle population increased in response to spruce trees being stressed by the defoliating insects *Nepytia* (a moth) and a spruce aphid, *Elatobium*, during the late 1990's, snow-caused damage to spruce in the early 1990's and a severe drought in the mid-1990's. Spruce beetle can severely impact many forest resources by killing up to 90 percent of spruce basal area and more than 70 percent of the spruce trees per acre in a stand over the extent of an outbreak (Dymerski et al. 2001).

### **Spruce Beetle in Recreation Sites**

The primary objective of this site visit was to conduct a post-flight survey for Spruce beetle-infested trees in the high elevation recreation sites. Our survey consisted of a 4-person walk through in and adjacent to the recreation sites of interest. Infested trees were identified by the presence of pitch tubes, pitch streaming, and/or boring frass in bark crevices and at the base of boles. If there was a question of whether the tree was successfully attacked by spruce beetle, a portion of the bark was removed and the cambium examined for egg and larval galleries and fungal stain development. Results of the survey are shown in Table 1. In addition, other tree species were examined for infestation by other bark beetles.

All infested trees were marked with blue paint to facilitate their removal. Trees were sprayed at breast height facing towards existing roads or trails. Removal should take place this fall if at all possible.

**Table 1.** Number of bark beetle-infested trees in recreation sites surveyed in the Pinaleño Mountains on 30 August 2001.

Recreation site	Infested trees by host species		
	Spruce	Douglas-fir	Pine
Shannon	33	2	-
Hospital Flat	55	-	-
Soldier Creek	21	-	1
Columbine homes	30	-	-
Old Columbine	5	-	-
<b>Total</b>	<b>144</b>	<b>2</b>	<b>1</b>



### **Recommendations for recreation sites**

1. Sanitation removal of infested spruce and other infested tree species. This approach removes currently infested trees and thereby decreasing localized beetle populations. Sanitation removal of infested trees, in combination with semiochemical treatments, has been demonstrated to reduce overall spruce mortality in Utah (Bentz and Munson 2000).
2. Treatment of infested trees on site. If infested trees cannot be removed from the site, trees can be treated by one of several methods. Felled trees can be limbed, bucked and burned (either completely or significantly scorched) to kill developing brood underneath the bark. Alternatively, the bark can be removed after felling through the use of a “log wizard”. Removing the bark results in the cambium drying to the point of becoming a non-food resource and the developing brood to desiccate and die. Infested stumps should also be treated by either burning or debarking.
3. Use of semiochemicals. Both aggregation and anti-aggregation pheromones can be used to reduce local populations, keep beetles out of localized areas, and/or pull beetles into areas where tree mortality can be tolerated. Aggregation pheromones are used as lures in funnel traps or as baits on felled trees to reduce local populations of beetles by concentrating and capturing the beetles. Funnel traps or trap trees are placed outside or adjacent to the areas to be protected. The use of anti-aggregation pheromones is still in the experimental phase for spruce beetle; however, there is evidence that new release devices may aid in the effectiveness of this preventative treatment. The anti-aggregation pheromones modifies the behavior of flying beetles and results in the dispersal of beetles away from the point source of the pheromone.

The Coronado NF has submitted a suppression and prevention proposal to limit the continued expansion of beetle-caused tree mortality in these recreation sites. The proposed treatments listed (sanitation removal of infested trees following post-flight surveys, use of both aggregation and anti-aggregation semiochemicals) are both technically and economically sound based on our recent surveys and observations. It is important to remember that bark beetle suppression and prevention treatments generally take several years to complete. Additional surveys and treatments will be necessary beyond FY 2002.

Although the application of chemical sprays, such as carbaryl, to prevent attacks on currently uninfested trees is a potential option in the recreation sites, at this time we recommend using the other treatments listed above. If these treatments fail to adequately protect the spruce in the recreation sites under the current beetle pressure or higher populations, we may recommend the spray option in the future.

### **Douglas-fir Beetle and Fire**

In addition to the survey of recreation sites, we briefly reviewed the prescribed burn area adjacent to summer homes along FSR 366. The burn took place in early June 2001. The objectives of the burn were to remove fuel loads and reduce smaller diameter pine and Douglas-fir in the understory; thereby, reducing the susceptibility for more severe wildland fires in the future. These objectives seemed to have been met; however, we noticed that some of the large

diameter Douglas-fir were significantly scorched (e.g., more than 50 percent of the crown and 100 percent of the lower bole were scorched). These trees will be highly susceptible to attack by Douglas-fir beetle, *D. pseudotsugae*. There have been several documented cases where this beetle has reached outbreak status following fire scorch damage to Douglas-fir (Pasek 1990). We did in fact find a few infested trees within the burn area. Douglas-fir beetles preferentially attack large, old trees in dense stands with a high Douglas-fir component. Douglas-fir beetle outbreaks typically last for several years and may result in the mortality of large numbers of trees. In some cases, this tree mortality may interfere with resource management objectives.

To take a proactive approach to prevent spread of this beetle from the burn area, we recommend that infested trees be removed and the deployment of anti-aggregation pheromone for Douglas-fir beetle. The anti-aggregation pheromone (3-methylcyclohex-2-en-1-one [MCH]) serves to disrupt aggregation behavior of beetles (Schmitz and Gibson, 1996). MCH has been used experimentally to reduce the level of attack in high-risk areas (Ross and Daterman, 1994, 1995) and is being used operationally to protect localized areas from being attacked by Douglas-fir beetle. A guide to the protocol for using MCH has been developed and is being forwarded to Dick Streeper and Randall Smith.

Funds may be available from Forest Health Protection to deal with both the Spruce beetle and Douglas-fir beetle situations. Request to these funds should be in no later than October 13. If you have any questions regarding this assessment of the current beetle activity within the recreation area or the potential effects on the residual and surrounding stands, please let us know. We can be reached at (928) 214-2471 McMillin or (928) 214-2463 Anhold.

/s/ John Anhold  
JOHN ANHOLD  
Arizona Zone Leader Forest  
Health

CC:  
Dick Streeper, Safford Ranger District, Coronado National Forest  
Randall Smith, Coronado National Forest  
Bob LeFevre, Coronado National Forest  
Joel McMillin, R3  
Debra Allen-Reid, R3  
Doug Parker, R3  
Leonard Lucero, R3

#### **REFERENCES CITED**

Bentz, B.J. and A.S. Munson. 2000. Spruce beetle population suppression in Northern Utah. Western Journal of Applied Forestry. 15: 122-128.

Dymerski, A.D., J.A. Anhold, and A.S. Munson. 2001. Spruce beetle (*Dendroctonus rufipennis*) outbreak in Engelmann spruce (*Picea engelmannii*) in central Utah. Western North American Naturalist 61: 19-24.

Pasek, J.E. 1990. Douglas-fir beetle infestations following the Clover Mist Fire on the Clarks Fork Ranger District, Shoshone National Forest, Wyoming. USDA For. Serv., Rocky Mountain Region, Biol. Eval. R2-90-01, 10 pp.

Ross, D. W., and Daterman, G. E. 1994. Reduction of Douglas-fir beetle infestation of high-risk stands by antiaggregation and aggregation pheromones. Can. J. For. Res. 24: 2184-2190.

Ross, D. W., and Daterman, G. E. 1995. Efficacy of an antiaggregation pheromone for reducing Douglas-fir beetle, *Dendroctonus pseudotsugae* Hopkins (Coleoptera: Scolytidae), infestation of high risk stands. Can. Entomol., 127: 805-811

Schmitz, R.F. and Gibson, K.E. 1996. Douglas-fir beetle. USDA For. Serv. Forest Insect and Disease Leaflet 5. 8 p.

Wilson, J.L., R. Fitzgibbon, and S. Dudley. 1999. Evaluation of a Spruce and Western Balsam Bark Beetle Outbreak on Mt. Graham. Safford Ranger District, Coronado National Forest. USDA Forest Service, Southwestern Region, Arizona Zone Entomology and Pathology Office.